REMARKS

The Office Action of March 17, 2009 has been reviewed and the Examiner's comments carefully considered. Claims 13-31 are pending in this application, and claims 13 and 31 are in independent form. Claims 13-30 are rejected under 35 U.S.C. § 103(a) for obviousness over United States Patent No. 5,289,867 to Barker et al. (hereinafter "the Barker patent") in view of United States Patent No. 5,770,832 to Carnes et al. (hereinafter "the Carnes patent"). Claim 31 is new. No new matter has been entered.

As defined by independent claim 13, the present invention is directed to a system for on-line prediction of mechanical property characteristics for hot rolled coils in a hot strip mill. The system includes a unit providing data on a rolling schedule in addition to chemistry regarding the product in the steel making stage. The system also includes field devices for obtaining real-time measuring parameters of the hot rolled coils during the rolling process. The data from the field devices is captured and converted using segment tracking from time domain data to space domain data. The system further includes a computation module that processes all data and predicts mechanical properties of the hot rolled coils, the properties along the length and through the thickness of the strip being rolled. The predicted mechanical properties are sent to a unit for use during production planning and scheduling.

The Barker patent refers to the cooling of a continuously rolled rod. The rod is going from liquid phase to solid phase during a cooling process. The Barker patent discusses a process where nozzle spray loops are controlled by a computer during the rolling stage only for a continuous cast bar. The operating mechanism depends on a series of historical data stored as a function of cast bar solidification temperature at exit to determine flow rates. Flow rates are achieved through regression analysis done off-line. In the present invention, the on-line system predicts coil temperature simultaneously over the entire length of the coil. The Ferrite grain size variation over the length of the coil is also shown. Further, the present invention predicts the amount of aluminum and nitrogen in solid solution over the length of the coil. This information helps for corrective actions in processing. Still further, the present invention predicts aluminum

and nitrogen in solution, yield strength, ultimate tensile strength, and percent elongation not only along the length but also through the thickness at three different locations – center, surface, and quarter thickness.

Such an on-line prediction system helps the rolling mill operator take corrective action to get nearly uniform mechanical properties along the length of the strip. This data is then sent to a computation module for processing. The Barker patent does not teach or suggest a system for on-line display of property prediction for hot rolled coils in a hot strip mill comprising a unit for providing data on a rolling schedule chemistry in the steel making stage.

Any calculations the Barker patent performs are obtained off-line during simulations (see Barker, page 14, lines 67-68).

The Examiner further refers to the Barker patent, column 13, lines 62 to column 14, line 4 as describing prediction. However, the cited passage only describes regression testing, using data that is measured once the bar exits the system. Furthermore, the data is off-line input into the system from the customer using specification data or cast bar data. Two essential elements of the claim are therefore not met as required in independent claim 13 in the present invention.

The Examiner also refers to the Barker patent, column 14, lines 34-66 and Fig. 2 as describing the acquisition of field device data. In this case, bar temperature on the surface is measured and may be further processed based on averaging, etc. However, the bar temperature is only used in relation to predicting mechanical properties sampled after a bar has exited the mold, not as they presently exist on the run out table during the hot strip mill process. In this case, the bar is sampled as it exits and the temperature and flow rate, which were previously saved data, are correlated with the sample data. This is in direct contrast to the present invention where prediction is performed, and prediction is prior to cold rolling, so actions can be taken as needed (see the present application, page 2-3, paragraph [0034]).

With regard to the Carnes patent, a system is described with relation only to a pulse welding system. The Carnes patent teaches development of properties within a weld zone electrical resistance welding process. Applicant believes both the properties required for the electrical resistance welding process and those properties developed during the electrical

resistance welding process are distinctly different from strip rolling. Therefore, given this distinction, Applicant believes it would not have been obvious to one of ordinary skill in the art of strip rolling to combine the description of the analysis of test welds of the Carnes patent with the Barker patent to create a system of predicting mechanical properties along the length and through the thickness of a strip being rolled. In addition, as cited, the only relevant discussion is regarding pipe wall thickness and width, which is not congruent with the subject matter of the present invention.

For the reasons stated hereinabove, Applicant believes that the subject matter of independent claim 13 is neither taught nor suggested by the Barker patent or the Carnes patent. Reconsideration of the rejection of claim 13 is therefore respectfully requested.

Claims 14-17, 23-25, and 27-30 depend from and add further limitations to independent claim 13 and are believed to be allowable for the reasons discussed hereinabove in connection to independent claim 13. Reconsideration of the rejection of claims 14-17, 23-25, and 27-30 is respectfully requested.

With regard to claims 18 and 26, neither the Barker patent nor the Carnes patent teaches or suggests a deformation sub-module as required by claims 18 and 26. In addition, claims 18 and 26 are believed allowable for the reasons stated hereinabove with regard to independent claim 13.

With regard to claim 19, neither the Barker patent nor the Carnes patent teaches or suggests a thermal sub-module as required by claim 19. In addition, claim 19 is believed allowable for the reasons stated hereinabove with regard to independent claim 13.

With regard to claim 20, neither the Barker patent nor the Carnes patent teaches or suggests a micro-structural sub-module as required by claim 20. In addition, claim 20 is believed allowable for the reasons stated hereinabove with regard to independent claim 13.

With regard to claim 21, neither the Barker patent nor the Carnes patent teaches or suggests a precipitation sub-module as required by claim 21. In addition, claim 21 is believed allowable for the reasons stated hereinabove with regard to independent claim 13.

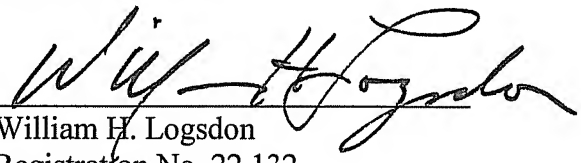
With regard to claim 22, neither the Barker patent nor the Carnes patent teaches or suggests a property prediction sub-module as required by claim 22. In addition, claim 22 is believed allowable for the reasons stated hereinabove with regard to independent claim 13.

Conclusion

For the reasons set forth above, Applicant believes claims 13-31 are patentable over the cited art and are in condition for allowance. Reversal of all of the Examiner's rejections and allowance of these claims are respectfully requested.

Respectfully submitted,

THE WEBB LAW FIRM

By 

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